

U.S. Patent Appln. S.N. 08/603,497
AMENDMENT AFTER ALLOWANCE

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REMARKS

This Amendment rewrites claims 1, 16 and 28 by making editorial changes to more distinctly claim the applicants' invention. Claims 1-29 are pending.

The purpose of this Amendment is to ensure the prosecution history clearly sets forth the proper interpretation of the claims, that the Patent Office agrees with this claim interpretation, and that the claims are allowed based on this claim interpretation.

On appeal, the applicants urged the claims require a 1,3-propylene diether having a cyclopolyenic ring structure¹ located at the C-2 carbon position, with the cyclopolyenic ring structure

¹Claim 1 defined the cyclopolyenic ring structure as follows: "a cyclopolyenic 1,3-diether in which only the carbon atom in position 2 belongs to a cyclic or polycyclic structure made up of 5, 6, or 7 carbon atoms, or 5-n or 6-n' carbon atoms, and respectively n atoms of nitrogen and n' heteroatoms selected from the group consisting of N, O, S and Si, where n is 1 or 2 and n' is 1, 2 or 3, said structure containing two or three unsaturations and optionally eing condensed with other cyclic structures, or substituted with one or more substituents selected from the group consisting of linear or branched alkyl radicals; cycloalkyl, aryl, aralkyl, alkaryl radicals and halogens, or being condensed with other cyclic structures and substituted with one or more of the above mentioned substituents which can also be bonded to the condensed cyclic structures; one or more of the above mentioned alkyl, cycloalkyl, aryl, aralkyl or alkaryl radicals and the condensed cyclic structures optionally containing one or more heteroatoms as substitutes for carbon or hydrogen atoms, or both."

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having 2 or 3 unsaturations contained within the ring directly attached to the C-2 carbon atom.

The Board rejected this interpretation based on the language of the claims on appeal:

Our construction of the subject matter defined by appellants' claim 1 is directed to the scope of the language cyclopolyenic 1,3-diether "optionally condensed with other cyclic structures." The issue at hand is whether the language of claim 1 requires that the ether groups be attached solely to a cyclopolyenic moiety containing 2 or three unsaturated groups or includes a polycyclic moiety having two or three unsaturated groups in at least one moiety fused to at least a second saturated moiety wherein the ether groups may be attached to the saturated cyclic moiety.

Decision, page 4, lines 5-11. The Board interpreted claim 1 to read on a saturated cyclic structure which is fused to other rings, at least one of the other rings containing two or three unsaturated groups:

[W]e interpret claim 1 as reading on polycyclic components wherein methoxy methyl or other ether groups may be attached to a cyclopolyenic moiety in which the 2-position is part of a cyclic structure which is in and of itself saturated but fused to other rings, at least one of the other rings containing two or three unsaturated groups.

Decision, page 4, line 20 to page 5, line 3. The Board's claim construction focused on the location of the ether groups on the 2-position carbon and the availability of the unsaturation of

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aromatic rings fused to a saturated ring to satisfy the multiple unsaturation limitation of claim 1.

Applicants subsequently urged the Board's interpretation is incomplete because it ignores the 5, 6 or 7 carbon atom limitation of the cyclopolyenic ring structure recited in claims 1, 16 and 28. See the Amendment Pursuant to 37 C.F.R. 1.196(b).

The Patent Office allowed the application based on this argument. See the Examiner's Statement of Reasons for Allowance on page 2 of the Notice of Allowability attached to the Notice of Allowance. However, the Patent Office may have construed the cyclopolyenic ring structure to be limited to 5, 6 or 7 carbon atoms exclusively, without regard to embodiments in which the cyclic or polycyclic cyclopolyenic ring structure, properly limited to 5, 6, or 7 carbon atoms, is optionally fused to one or more additional ring systems. Accordingly, the application is being withdrawn from issue to ensure the prosecution history clearly reflects the complete and proper scope of the "cyclopolyenic ring structure" recited in the claims.

1. The Cyclopolyenic Ring Structure May be Polycyclic

The language of each of independent claims 1 and 16 expressly defines "cyclopolyenic ring" to include "cyclic or polycyclic

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structures". Accordingly, the cyclopolyenic ring structure includes fused (polycyclic) structures.

2. The Cyclopolyenic Ring Structure is limited to 5, 6 or 7 carbon atoms

The claims expressly require the cyclopolyenic ring to contain only 5, 6 or 7 carbon atoms, or 5-n or 6-n' carbon atoms, and respectively n atoms of nitrogen and n' heteroatoms selected from the group consisting of N, O, S and Si, where n is 1 or 2 and n' is 1, 2 or 3. Accordingly, the "polycyclic" cyclopolyenic ring structure embodiment is limited to polycyclic rings having 5, 6 or 7 carbon atoms.

3. The Cyclopolyenic Ring Must Have 2 or 3 Unsaturation

The claims expressly require the cyclopolyenic ring to contain 2 or 3 unsaturations. Accordingly, the "polycyclic" embodiment of the cyclopolyenic ring structure must (1) contain only 5, 6 or 7 carbon atoms and (2) contain 2 or 3 unsaturations. One example of such a "polycyclic" cyclopolyenic ring is based on 2,5-norbornadiene, also known as bicyclo[2.2.1]hepta-2,5-diene. 1,3-diethers coming within the claimed definition include 7,7-bis(methoxymethyl)2,5-norbornadiene (Specification, page 12, last line).

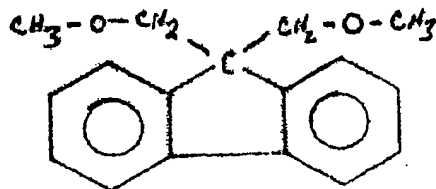
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4. The Cyclopolyenic Ring May Be Fused to Other Ring Systems

The claim language expressly states the cyclopolyenic ring may be optionally condensed with other cyclic structures. Accordingly, both the cyclic and polycyclic embodiments of the cyclopolyenic ring structure may be fused to one or more rings.

An example of the optionally fused embodiment of the cyclopolyenic ring is 9,9-bis(methoxymethyl)fluorene:



The cyclopolyenic ring structure of this compound consists only of the central ring, which satisfies the 5, 6 or 7 carbon atom limitation and the 2 or 3 unsaturations limitation. The aromatic rings fused to the central ring are not part of the cyclopolyenic ring, even though they are fused to the central ring and share the 2 or 3 unsaturations of the central ring.

5. The Cyclopolyenic Ring May Be Substituted

The claim language expressly states the cyclopolyenic ring may be optionally substituted with a Markush grouping of permissible substituents.² Accordingly, both the cyclic and polycyclic

²These substituents are selected from the group consisting of linear or branched alkyl radicals; cycloalkyl, aryl, aralkyl,

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embodiments of the cyclopolyenic ring structure may be substituted with one or more substituents.

6. The Cyclopolyenic Ring May be Fused and Substituted

The language of claim 1 expressly provides that the cyclopolyenic ring may optionally be both fused to another ring and substituted. Accordingly, both the cyclic and polycyclic embodiments of the cyclopolyenic ring structure may be fused to another ring system and substituted with one or more substituents.

In summary, the "cyclopolyenic ring structure" recited in the claims is expressly defined therein to include the following features:

1. it is either cyclic or polycyclic;
2. it is limited to 5, 6 or 7 carbon atoms;
3. it must have 2 or 3 unsaturations;
4. it may be fused to one or more other ring systems;
5. it may be substituted with one or more substituents; and
6. it may be both fused to one or more other ring systems and substituted with one or more substituents.

The presently-amended claims define patentable subject matter over the prior art of record for the reasons set forth in the Brief on Appeal.

alkaryl radicals and halogens. See claim 1.

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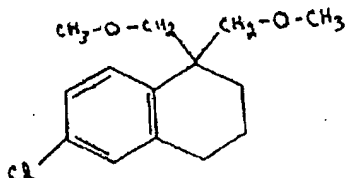
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A. Claim 1 is Novel Over Albizzati '213

U.S. Patent No. 5,068,213 to Albizzati et al. ("Albizzati '213") discloses 1,1-bis(methoxymethyl)-6-chloro-tetrahydronaphthalene (Col. 3, lines 28-29). The Board found this compound anticipates Applicants' claim 1 based on its claim interpretation which permits the 2 or 3 unsaturations requirement to be satisfied by a polycyclic ring structure in which the required 2 or 3 unsaturations are satisfied by a ring not directly attached to the C-2 carbon atom. (Decision, page 5, last line to page 6, line 1).

However, the Board's interpretation ignores the express requirement that the cyclic or polycyclic cyclopolyenic ring structure have 5, 6 or 7 carbon atoms, in addition to having 2 or 3 unsaturations and being located on the C-2 carbon position.

There are ten carbon atoms in the cyclopolyenic structure of 1,1-bis(methoxymethyl)-6-chloro-tetrahydronaphthalene, set forth below:



Claim 1 is not anticipated by this compound because claim 1 expressly requires the carbon atom in position 2 to belong to a cyclic or polycyclic structure made up of 5, 6 or 7 carbon atoms, or a smaller number of carbon atoms if nitrogen, oxygen, sulfur

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and/or silicon atoms are present. In contrast, 1,1-bis(methoxymethyl)-6-chloro-tetrahydronaphthalene has 10 carbon atoms in its fused ring structure.

B. Claim 1 is Patentable Over Albizzati '213

Claim 1, as properly construed, is patentable over Albizzati '213 for the reasons discussed in the Appellant's Brief on Appeal. Albizzati '213 defines a structural formula for "particularly useful" 1,3-diethers beginning at Col. 2, line 9. Although unsaturated radicals are included within the definitions of R_1 , R_2 , X and Y, Albizzati '213 fails to disclose or suggest 1,3-diethers having a cyclopolyenic ring structure in which only the 2-position carbon atom belongs to a cyclic or polycyclic structure containing 2 or 3 unsaturations and a maximum of 7 carbon atoms, which may be optionally fused to one or more additional cyclic rings, or that the use of such cyclopolyenic 1,3-diethers as either internal or external electron donors to olefin polymerization catalysts permits very high levels of stereospecificity while maintaining high catalytic activity. More particularly, X and Y are radicals attached to the central carbon of the 1,3-diether. Although X may be unsaturated, there is no cyclic structure identified wherein the central carbon atom is part of the ring. Similarly, Y is either hydrogen, a C_{1-18} hydrocarbyl radical, or the same as X when X is certain compounds. See col. 2, lines 25-53.

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Albizzati '213 also teaches that X and Y can be bonded together to form a C₁₋₁₈ hydrocarbon ring, optionally containing selected heteroatoms and optionally bonded to the central carbon atom through "a" double bond (Col. 2, lines 54-60). This disclosure fails to suggest the multiply unsaturated cyclic structure required by the claimed invention, particularly in view of the non-cyclic definition of X (when it is not bonded to the Y radical) which can contain "at least" one double bond.

Albizzati '213 lists "representative" 1,3-diethers which contain halogen atoms (Col. 2, line 61 to Col. 3, line 58), diethers which contain heteroatoms other than halogens (Col. 3, line 59 to Col. 4, line 35), unsaturated 1,3-diethers (Col. 4, line 36 to Col. 5, line 11), and diethers which contain heteroatoms and unsaturation (Col. 5, lines 12-52). None of these diethers contain the cyclopolyenic structure required by the properly-construed claims of this application.

Albizzati '213 lists a mono-unsaturated analog among many other non-analogous diethers. However, one of ordinary skill in the art is not given any suggestion or motivation to modify this mono-unsaturated analog by incorporating additional unsaturation into the ring containing the central (2-position) carbon atom because 1,1-bis(methoxymethyl)-6-chloro-tetrahydronaphthalene is classified by Albizzati '213 with "diethers containing halogen

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atoms" (Col. 2, lines 61-62) rather than being identified with the "unsaturated diethers" at Col. 4, line 36 et seq. One of ordinary skill in the art *might* consider additional halogenation but is given no suggestion to incorporate additional unsaturation into 1,1-bis(methoxymethyl)-6-chloro-tetrahydronaphthalene in view of its classification with "diethers containing halogen atoms".

C. Claim 1 is Patentable Over Albizzati '492

Claim 1, as properly construed, is patentable over Albizzati '492 for the reasons discussed in the Appellant's Brief on Appeal. Just like Albizzati '213, Albizzati '492 fails to disclose or suggest 1,3-diethers having a cyclopolyenic ring structure in which only the 2-position carbon atom belongs to a cyclic or polycyclic structure containing 2 or 3 unsaturations and a maximum of 7 carbon atoms, which may be optionally fused to one or more additional ring systems, or that the use of such cyclopolyenic 1,3-diethers as either internal or external electron donors to olefin polymerization catalysts permits very high levels of stereospecificity while maintaining high catalytic activity.

The Decision identifies 1,3-diethers which are said to come within the scope of Applicants' claim 1. However, these 1,3-diethers fail to satisfy or suggest the combination of two or three unsaturations and a maximum 7 carbon atom limitation for the cyclic or polycyclic structure of the 1,3-diethers contained in the

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claimed solid catalyst component. Thus, 1,1-dimethoxymethyl-1,2,3,4-tetrahydronaphthalene has a saturated fused ring system and thus does not satisfy the 2 or 3 unsaturations requirement of the cyclopolyenic ring structure. Similarly, the other two diethers cited in the Decision are indanes³, whose ring structure does not satisfy the combination of two or three unsaturations and a maximum 7 carbon atom limitation for the cyclic or polycyclic cyclopolyenic ring structure of the 1,3-diethers contained in the claimed solid catalyst component. One of ordinary skill in the art is given no suggestion or motivation to modify these compounds to arrive at the diethers required by the claimed solid catalyst component.

D. Claim 1 is Patentable Over Barbé et al.

Claim 1, as properly construed, is patentable over Barbé et al. for the reasons discussed in the Appellant's Brief on Appeal. Just like Albizzati '213 and Albizzati '492, Barbé et al. fails to disclose or suggest 1,3-diethers having a cyclopolyenic ring structure in which only the 2-position carbon atom belongs to a cyclic or polycyclic structure containing 2 or 3 unsaturations and a maximum of 7 carbon atoms, which may be fused to one or more additional ring structures, or that the use of such cyclopolyenic 1,3-diethers as either internal or external electron donors to

³1,1-dimethoxymethylindane and 2,2-dimethoxymethylindane.

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olefin polymerization catalysts permits very high levels of stereospecificity while maintaining high catalytic activity.

The Decision cites Col. 3, lines 7-10 as disclosing 1,3-diethers directed to naphthalene and indane derivatives.⁴ However, as discussed above, naphthalene and indane derivatives fail to satisfy or suggest the combination of two or three unsaturations and a maximum 7 carbon atom limitation for the cyclic or polycyclic structure of the 1,3-diethers contained in the claimed solid catalyst component.

E. The Board Found There Is No Motivation To Combine Any of the Three Primary References With Denko

The Examiner had applied all three primary references in view of Japanese Patent Publication 2-242804 to Denko. However, the Board found there was neither motivation to combine nor a reasonable chance of success for substituting its polyenic unsaturation for that of the primary references (Decision, page 7, lines 1-4). Applicants heartily agree with these findings.

It is believed the application is once again in condition for allowance. Accordingly, issuance of a Notice of Allowance directed to claims 1-29 is earnestly requested. The Examiner is urged to

⁴Col. 3, lines 7-10, of Barbé et al. list the following compounds: 1,1-dimethoxymethyl-1,2,3,4-tetrahydronaphthalene; 1,1-dimethoxymethyl-decahydronaphthalene; 1,1-dimethoxymethylindane-2,2-dimethoxymethylindane; and 1,1-dimethoxymethyl-2-isopropyl-5-methylcyclohexane.

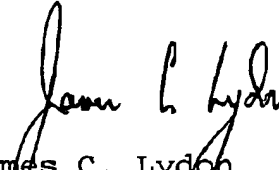
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telephone the undersigned should he believe any further action is required for allowance.

It is not believed that any fee is required for entry and consideration of this Amendment. Nevertheless, the Commissioner is authorized to charge our Deposit Account No. 50-1258 in the amount of any such required fee.

Respectfully submitted,



James C. Lydon
Reg. No. 30 082

Atty. Case No.: US-12001+2+3
100 Daingerfield Road
Suite 100
Alexandria, Virginia 22314
Telephone: (703) 838-0445
Facsimile: (703) 838-0447